

Name: _____ Date: _____ Period: _____

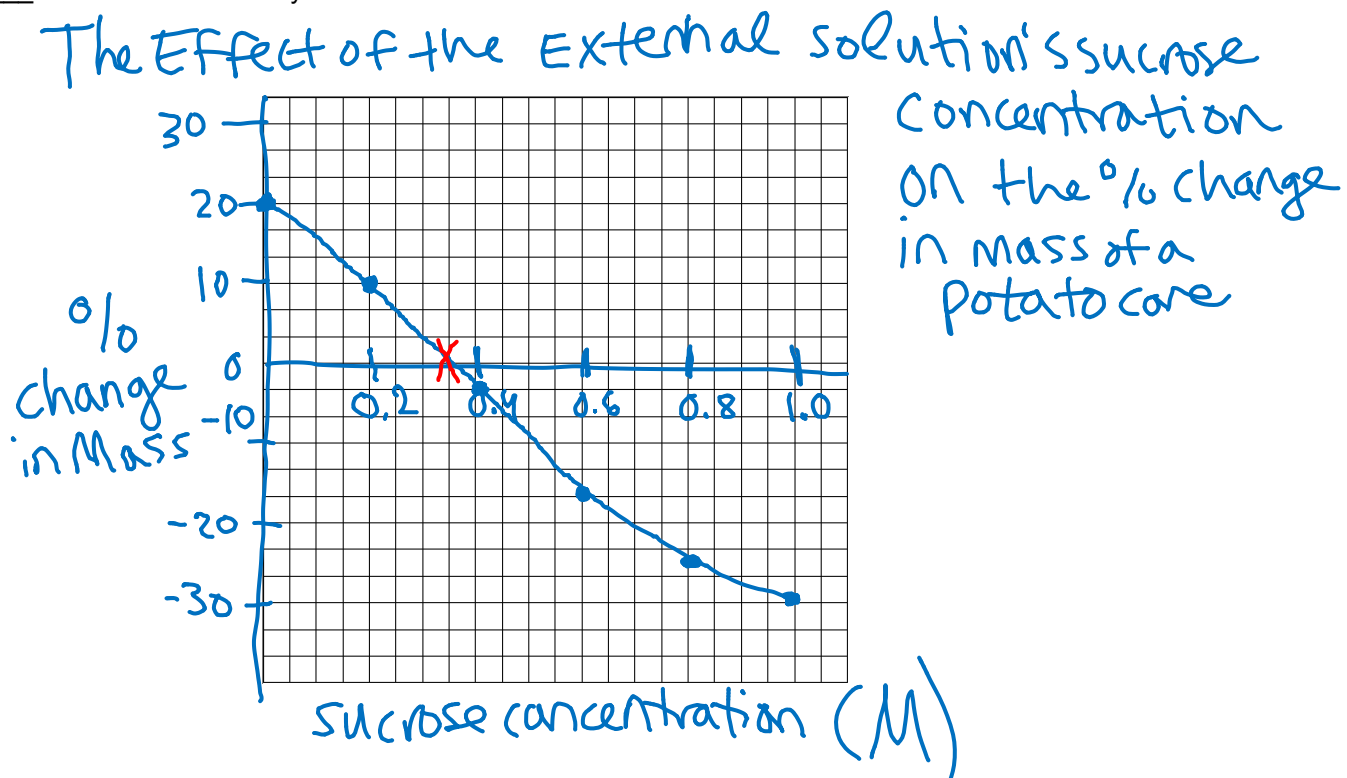
Determining the Solute Concentration of a Potato Cell

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Background Information: Potato cores placed in sucrose solutions at 27°C resulted in the following percent changes after 24 hours:

% Change in Mass	Sucrose Molarity
20.0%	Distilled water
10.0%	0.2 M
-3.0%	0.4 M
-17.0%	0.6 M
-25.0%	0.8 M
-30.0%	1.0 M

1. Graph the results on the grid given below. Give your graph a title with the format: "The Effect of _____ on _____." Make sure to label your axes.



2. Estimate the molar concentration of sucrose within the potato cells using the graph above. How did you obtain your answer?

The sucrose concentration of the potato cells is approximately 0.35 M because this is the concentration at which the potato cells are at equilibrium with the outer solution. At this concentration, there is no net movement of water into or out of the potato cells (approximately 0% change in mass).

3. Calculate the solute potential of sucrose inside the potato cells using the formula given below. Remember, sucrose does not break apart in water. (This will help you determine the ionization constant, i) Assume that the potato cells are at room temperature (298 K).

$$\Psi_s = -iCRT = -(1)(0.35)(0.0831)(298) = -8.67$$

4. Is the water potential in the potato cells higher or lower than the water potential in the 0.2 M sucrose solution?
How do you know?

Lower because water moves into the potato cells (+% change in mass) from a high water potential in the outside solution to a low water potential in the potato cells.

5. Is the water potential in the potato cells higher or lower than the water potential in the 0.4 M sucrose solution?
How do you know?

Higher because water moves out of the potato cells (-% change in mass) from a high water potential in the potato cells to a low water potential in the outside solution.